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Effect the Addation the Vegetative Growth for Diet and Exudates for drinking water of *Pleurotus ostreatus* Fungus on the Productivity and Physiological Traits of Broiler Chicken

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Abstract: ***The study was conducted in the field of poultry of the Department of Livestock - Faculty of Agriculture - University of Kufa For the period from 15 September to 20 October 2014. The purpose of the study was to test the effect of addition the biomass to the feed and exudates to the drinking water of Pleurotus ostreatus fungus on some productive and physiological traits for broiler chicks . A total of 360, one day old, Ross 308 broiler chicks were randomly allocated into eight treatment groups chicks in each treatment group were sub-divided into three replicates . The eight treatment groups were as follow : T1: the control treatment without any additives. T2: Add Vegetative growth of P.ostreatus 25 g / kg feed. T3: Add Vegetative growth of P.ostreatus 50g / kg feed. T4: Add Vegetative growth of P.ostreatus 100 g / kg feed. T5: Add exudates of P.ostreatus 25 ml / liter in drinking water. T6: Add exudates of P.ostreatus 50 ml / liter in drinking water. T7: Add exudates of P.ostreatus 100 P.ostreatus / liter in drinking water. T8: Add Vegetative growth 50g / kg to feed and 50 ml / liter exudates of P.ostreatus in drinking water. The data showed the following results : There are significant differences between treatments in the rate of body weight, where the results of the fifth week indicate superiority seventh treatment (add exudates P.ostreatus rate of 100 / liter in drinking water) significant on all treatment where the average body weight of living (2287.5) g while the control treatment that amounted to (1809.1) g . Results shown the existence of significant differences in the rate of weight gain of the various treatment , where gave the seventh highest increase treatment weight gain weekly was (2133.7) g, while the increase of the weight weekly in the control treatment (1655.2) g. The highest amount of Feed consumption was in fourth treatment Where the average of Cumulative weekly feed intake at (3305.82) gm While the control treatment amounted (3045.11) . the results of total feed efficiency indicate superiority treatment seventh significant on all treatment Where it reached (1.38) .***

Keywords: *Pleurotus ostreatus* Vegetative growth & exudates ,productivity and physiological traits of Broiler chicken

1. Introduction

Cultivation of oyster mushroom (*Pleurotus ostreatus*) has increased tremendously throughout the world owing to its excellent flavour, taste and higher biological efficiency [1, 2] and of their abilities to grow at a wide range of temperature and utilizing various agro-based residues. The fungus belongs to class *Basidiomycetes*, subclass *Hollobasidiomycetidae*, order *Agaricales* [3]. *Pleurotus* species are efficient lignin degraders, which can grow on different agricultural wastes with broad adaptability to varied agro-climatic conditions [4]. Also It is generally reported that some fungi like *Pleurotus spp*.

P. ostreatus demands few environmental controls, and their mycelia and fruiting bodies are not often attacked by diseases and pests, and they can be cultivated in a simple and economic way [5]. Additionally, It requires a short growth time in comparison to other edible mushrooms [6]. Oyster mushrooms are rich source of proteins, vitamin C, B complex (thiamine, riboflavin, folic acid and niacin), minerals (Ca, P, Fe, K and Na). Also (Oyetayo and Ariyo) reported that the phenolic compounds in wild *P. ostreatus* has antioxidant and antimicrobial activity[7]. *P. ostreatus* membranes and cell walls are riches by Selenium [8] also incorporation into proteins reveals a great potential to improve the nutritional value of the *P. ostreatus* [9]. As a result of this positive characteristic possessed in this fungus and the availability of large quantities of wheat residue which its a less useful of animals vegetable because they contain high amounts of cellulose associated with Allknyn by strong bonds . And the ability of this fungus to grow in those waste, and increased demand in recent years as a result of the white meat annual increase in the number of the world population, and because of that So this study aimed to work diet media from this waste to cultivation of this fungus vegetatively (biomass) For the purpose of use in poultry feed in quickly, and highest quantity and thus determine the effect of adding oyster mushrooms to ration In growth indicators and some blood characteristics of poultry, especially to our knowledge, this study is the first to show the physiological and health effects of vegetative growth and exudates of this fungus in poultry feeding .

2. Material and Methods

Pure cultures of *P.ostreatus* was obtained from Faculty of Agriculture, Department of plant protection, University of kufa, Iraq. Fresh cultures were obtained by repeated sub-culturing on Potato Dextrose Agar (PDA).

2.1 Treatment of straws

Wheat straw was collected from local farms in Kufa, Iraq. They were selected because they are readily available, as agricultural wastes and cause environmental problem by their burning in the fields. straw substrate were cut into small pieces (3-4 cm). 0.2% CaCO3 was added with chopped substrate and mixed thoroughly. Two methods used for the cultivation of oyster mushrooms on wheat straw:-

The first way :-The wheat straw were soaked in water for 24 hours to moisture them thoroughly were stalked on the steep cemented floor so as to remove the excessive moisture from the substrates to get 50- 70 % moisture level. without sterilization next day the bags were inoculated with the spawn of oyster mushroom (*P.ostreatus*). The bags were than inoculated for To grow Mycelium under complete darkness at controlled temperature of 25 ◦C. The temperature was controlled by electric heaters and relative humidity was kept at 60 ± 5% For a period of 28 days, After that, samples were dried in oven (50 °C) to crush For small parts

The second method:- Boil 1 kg of wheat straw in 3 liters of water for 20 minutes, then filtered in demodulator in Flasket capacity of 2 liters , after cooling cultivated by *P.ostreatus* The Flaskets were than inoculated by the fangus grow To grow mycelium under complete darkness at controlled temperature of 25 ◦C. The temperature was controlled by electric For a period of 28 days, After that, Then were collected exudates mushrooms. Use of biomass and exudates mushrooms prepared in the above methods, Then added to the of poultry in Different concentrations.

Energy and protein in the starter diet were provided as shown in Table (1).and the Finisher diet were provided as shown in Table (2).

Field experiment:- Study the effect of adding biomass and the exudates of the fungus *P.ostreatus* of diets and drinking water in recipes productive performance and some physiological traits of broiler chickens .

To know the effect of the exudates and biomass of the fungus *P.ostreatus* on the growth of broiler chickens used three levels of exudates mushrooms were added with drinking water and also used three levels of biomass is added to the diet of chicken meat from the first week of the breeding until the fifth week. The experiment was conducted in the field of poultry and agricultural research station trials, Faculty of Agriculture, University of Kufa for the period from 22/9 up to 27/10/2014.

Experiment design and implementation.

experiment carried out in accordance with the complete design randomization and used the 360 chicks of broiler chickens type Ross 308 day-old, weighed the chicks and the average weight 43 grams / chick, were randomly divided on seven transactions by 60 chicks transaction per three replications twenty chick each repicate, given in The first day the sugar solution 40 grams sucrose / liter of water, and the transactions experiment as follows:

1) T1: the control treatment without any additives.
2) T2: Add Vegetative growth of *P.ostreatus* 25 g/kg feed.
3) T3: Add Vegetative growth of *P.ostreatus* 50g/kg feed.
4) T4: Add Vegetative growth of *P.ostreatus* 100g/kg feed.
5) T5: Add exudates of *P.ostreatus* 25 ml/liter in drinking water.
6) T6: Add exudates of *P.ostreatus* 50 ml/liter in drinking water.
7) T7: Add exudates of *P.ostreatus* 100 *P.ostreatus* / liter in drinking water.
8) T8 = Add Vegetative growth 50g / kg to feed and 50 ml / liter exudates of *P.ostreatus* in drinking water.

3. Results & Discussion

Table (3)shows Average live body weight (g), where the results of the fifth week indicate superiority seventh treatment (add exudates *P.ostreatus* rate of 100 / liter in drinking water) significant on all treatment where the average body weight of living (2287.5) g while the control treatment that amounted to 1809.1 g, while the fourth treatment given less live body weight (g) was 1766.5 g , This study is consistent with a previous study conducted by [10], where the treatment showed leaky fungus *P.aphanidermatum* added to drinking water to the increase in body weight compared with the control treatment and the treatment Add biomass of fungus *P.aphanidermatum* to diet poultry.

Results shown in Table (4) to the existence of significant differences in the rate of weight gain of the various treatment, where gave the seventh highest increase treatment weight gain weekly was (2133.7) g, while the increase of the weight weekly in the control treatment (1655.2) g, this study are consistent with previous studies indicated the influence of some fungi increase the weight weekly Poultry. While the highest amount of Feed consumption (table 3) was in fourth treatment Where the average of Cumulative weekly feed intake at (3305.82) gm While the control treatment amounted (3045.11) , These results agreed with the study conducted by. [11] as noted significant superiority in the amount of feed consumption of chicks broilers given effective microorganisms (EM) Effective microorganisms which consists of phototrophic bacteria and lactic acid bacteria and yeasts and Actinomycets and fungi fermented by drinking water and diet together while explained [12], the lack of significant differences between treatment when using fungus *Scytalidium acidophilum* in the diets of broilers.

Results shown in Table (5) Effect of adding biomass and the exudates of the fungus *P.ostreatus* on the feed efficiency where the results of total feed efficiency indicate superiority treatment seventh (add exudates *P.ostreatus* rate of 100 / liter in drinking water) significant on all treatment Where it reached (1.38) Followed by Eighth treatment (Add biomass mushroom by 50g / kg feed and 50 ml / liter in drinking water) Where it reached (1.47) While the control treatment Reached (1.82). This result agreed with the result of (13) when you add the powder of Aspergillus spp 0.02% in broiler diets lead to improved feed conversion ratio. Payne and Southern [14] on the results of similar when using Prebiotic by 6% in the diets of broilers, which led to improved feed conversion ratio.

The addition leaky fungus to drinking water or biomass of the fungus itself to the diets of broilers has led to a significant improvement for all experimental treatments may work to increase the vitamins, amino acids [15] as well as it works to strengthen the case health and growth of the birds of experimental treatments, especially in the first weeks of life in order to speed the growth of the broiler in this period, and their need for protein and essential amino acids, more.

From the above we can deduce that the leaky add *P.ostreatus* s to drinking water or biomass of the fungus itself to the diets of broilers has led to a significant improvement for all experimental treatments compared with others treatment. And that these increases in body weight that might come as a result of the secretion of fungus *P.ostreatus* some enzymes such as Cellulase and chitinase [16] and which has a role in the contribution to the process of digestion inside the digestive tract of broiler and thus make better use of materials feed ,and improves the feed efficiency which led to increase the body weight .

It may also contribute to these enzymes secreting of *P.ostreatus* used in this study support the enzymes in the intestinal flora of secreting in the inner lining of the digestive tract of birds. Or that it is working to increase the vitamins and amino acids [15] which reflects positively on the health and vitality of the gastrointestinal tract and thus it was due to increase the efficiency of digestion and absorption of the material feed, achieving faster and better for the broiler growth .

Table (7) Effect of adding biomass and the exudates of the fungus *P.ostreatus* on some blood parameters which indicated a better value in PCV on seventh treatment compared with all treatment . also the resulte showed better Density RBC and WBC were Reaching (2.88) 106/ml and (24.76) 103/ml Respectively compared with control treatment were Reaching (2.12) 106/ml and (21.14) 103/ml Respectively These results were found by [17], who found that adding probiotic diet could be inhibited the nutritional stress or any stress which causes an increases in Density RBC and WBC [18].

Table (7) showed significant differences in total protein between treatments of adding Biomass of *P.ostreatus* and adding the exudates of the *P.ostreatus* , It is noted superiority the adding the exudates At the treatment of adding Biomass of *P.ostreatus* in total protein .

The results (Table 7) showed significant differences seventh treatment (add exudates *P.ostreatus* rate of 100 / liter in drinking water) in the concentration of glucose in the blood serum of broiler chickens 35 days old, which amounted to 229mg / 100 ml is superior to all treatment and the control treatment, which was 252mg / 100 ml. These results are consistent with the results of. [19] When you add oyster mushroom *Pleurotus osteatus* to the diets of broilers as glucose concentration in serum decreased significantly.

The cholesterol on control treatment significantly increased compared with all treatment which amounted in control treatment to 137 mg / 100 ml , While was in the seventh treatment (98) mg / 100 ml .

The improvement in the characteristics of productivity birds and immune believed that this fungus positive role in increasing the efficiency of digestion of feed materials covered by the secretion of some digestive enzymes as well as enzymes secreting inside the body and increase the absorption of nutrients digested in addition to its contents biomass of this fungus and exudates of materials or components food important, as well as improve the health status of the birds by increasing the immune response and cellular .

Table 1: energy and protein in the starter diet

	Treatment							
	T_1^*	T_2	T_3	T_4	T_5	T_6	T_7	T_8
Energy	3152	3075	2990	2820	3152	3152	3152	3152
Protein	22.49	23.20	23.16	23.08	22.49	22.49	22.49	22.49
C : P ratio	140.1	132.5	129.1	122	140.1	140.1	140.1	140.1

Table 2: energy and protein in the Finisher diet

	Treatment							
	T_1^*	T_2	T_3	T_4	T_5	T_6	T_7	T_8
Energy	3258	3031	3118	2948	3258	3258	3258	3258
protein	20.82	20.1	20.33	19.85	20.82	20.82	20.82	20.82
C:P ratio	157.5	150.8	153.3	148.5	157.5	150.8	153.3	148.5

Table 3: Effect of adding biomass and the exudates of the fungus *P.ostreatus* on the weights on live body weight

Treatment	Average live body weight (g/bird) for weeks				
	1	**2**	**3**	**4**	**5**
T_1	153.93*	372.12	703.24	1230.7	1809.1
T_2	154.42	370.94	698.93	1226.3	1797.7
T_3	160.01	367.33	690.53	1219.1	1785.3
T_4	156.66	355.21	677.18	1185.4	1766.5
T_5	152.96	382.06	735.66	1297.2	1867.2
T_6	157.18	409.25	889. 46	1342.8	1978.2
T_7	153.77	469.66	983.95	1516.3	2287.5
T_8	158.23	455.93	866.84	1383.7	2199
L.S.D 0.05	6.33	10.22	31.02	50.44	88.24

Table 4: Effect of adding biomass and the exudates of the fungus *P.ostreatus* on the Weight gain

Treatment	Average weight gain (g/bird) for weeks				Cumulative weekly weight gain (g)
	2	**3**	**4**	**5**	
T_1	218.2	331.1	527.42	578.45	**1655.2**
T_2	216.5	328	527.4	571.33	**1643.2**
T_3	207.3	323.2	528.61	566.19	**1625.3**
T_4	198.6	322	508.24	581.12	**1609.9**
T_5	229.1	353.6	561.5	570.05	**1714.3**
T_6	252.1	480.2	453.38	635.32	**1821**
T_7	315.9	514.3	532.38	771.12	**2133.7**
T_8	297.7	410.9	516.82	815.29	**2040.7**
L.S.D 0.05	**20.18**	**29.33**	**48.01**	**61.12**	**90.28**

Table 5: Effect of adding biomass and the exudates of the fungus *P.ostreatus* on the Feed consumption

Treatment	Averge feed intake (g/bird)(g/week)				Cumulative feed intake(g)
	2	3	4	5	
T_1	382.47	589.14	956.2	1117.3	3045.11
T_2	387.12	598.74	965.48	1125.7	3077.04
T_3	390.24	611.45	1010.14	1187.09	3198.92
T_4	396.87	658.67	1023.88	1226.4	3305.82
T_5	379.81	583.72	946.34	1130.7	3040.57
T_6	374.74	728.84	801.41	1156.2	3061.19
T_7	369.87	670.95	758.03	1237.47	3036.32
T_8	371.54	584.04	781.17	1389.11	3125.86
L.S.D 0.05	38.14	43.74	69.07	72.04	15.41

Table (6) Effect of adding biomass and the exudates of the fungus *P.ostreatus* on the feed conversion

Treatment	*Feed conversion ratio(g/bird) (g/g weight gain)*				*Total feed conversion*
	2	3	4	5	
T_1	*1.75	1.78	1.81	1.93	**1.82**
T_2	1.79	1.83	1.83	1.97	**1.85**
T_3	1.88	1.89	1.91	2.1	**1.95**
T_4	2	2.05	2.01	2.11	**2.04**
T_5	1.66	1.65	1.69	1.98	**1.74**
T_6	1.49	1.52	1.77	1.82	**1.65**
T_7	1.17	1.3	1.42	1.6	**1.38**
T_8	1.25	1.42	1.51	1.7	**1.47**
L.S.D 0.05	0.1	0.12	0.15	0.2	**0.3**

***Values represent average analysis three replicates.**

Table 7: Effect of adding biomass and the exudates of the fungus *P.ostreatus* on some blood parameters

treatment	*Glucose mg / dl*	*Cholesterol mg / dl*	*Total Protein g/dl*	*)PCV(%*	*RBC 106/ml*	*WBC 103/ml*
T_1	252	137	3.94	30	2.12	21.14
T_2	260	133	3.91	31	2.24	21.74
T_3	266	129	3.86	32	2.29	22.21
T_4	279	118	3.77	35	2.47	22.76
T_5	248	130	4.04	32	2.30	21.69
T_6	240	124	4.35	34	2.31	22.87
T_7	229	98	4.96	37	2.88	24.76
T_8	233	105	4.71	36	2.74	23.05
L.S.D.	**8.6**	**12.4**	**0.7**	**4.5**	**0.21**	**1.7**

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